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THE NEWSPAPER FOR
THE HOBBYIST OF VINTAGE
ELECTRONICS AND SOUND

THE HORN SPEAKER

TELEGRAM AND EVENING MAIL RADIO

Saturday, March 21, 1925.

Mystery Taken Out of De Forest Set

Weagant's Pet Complete and Powerful

By E. A. LIVINGSTONE, M. E.,
(Technical Director, De Forest Radio Institute.)

THE latest De Forest creation has drawn such widespread attention through its consistent performance that many "fans" may wish to know something about the circuit used and other things pertaining to its operation. In order to take the "mystery" out of radio—when not addressing a body of engineers—it is the writer's custom to use the simplest terms possible. And, therefore, in describing the D-17 circuit in the space available, he will attempt to avoid a technical dissertation. Most "fans" are acquainted with the terms used and the functions of the various parts.

The De Forrest D-17 is an entirely self-contained 5-tube receiving set, designed for loop reception, with a wave length range of 220 to 550 meters.

From the schematic diagram it will be seen that the circuit consists of two stages of tuned radio frequency amplification, one stage of untuned or "transformer coupled" radio frequency amplification, and two stages of audio frequency amplifi- and two stages of audio freqency amplification, the first of which is reflexed through the third radio frequency tube.

The incoming signal is intercepted by the loop which is inserted in the jack, or by the antenna under circumstances which will be referred to later. The special folding loop has sixteen turns. A switch is provided to cut out five turns for efficient reception of wave lengths below 400 meters. The .0005 mfd. variable condenser tunes the loop and the grid or input of the first radio frequency tube. The amplified energy passes through the primary of the tuned radio frequency transformer and is transferred by electromagnetic induction to the secondary winding, which is tuned by the .0005 mfd. variable condenser, whence it is impressed on the grid of the second radio frequency tube. The further amplified energy now passes to the primary of the fixed or untuned radio frequency transformer, and is transferred by induction to the secondary coil, whence it is impressed on the grid of the third tube. The still further amplified energy is passed on through fixed transformer to the detector tube, where it is rectified or changed into an audio frequency current. The audio frequency energy now passes to the primary of audio frequency transformer (which is of 5-1 ratio), and is transferred by induction to the secondary, whence it is applied to the grid of the third tube by flowing through the secondary winding of fixed transformer.

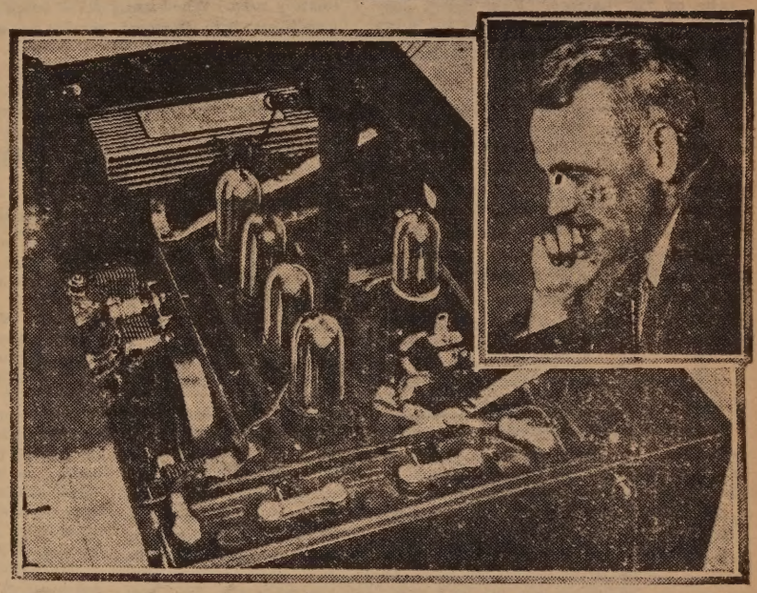
Third Tube Reflexed.

It will now be seen that this third tube is the "reflexed" tube which acts as both the third radio frequency and the first audio frequency amplifier. From the plate or output of tube the amplified current flows through the primary winding of the second fixed transformer to the primary of the second audio frequency transformer (which is of 3.5-1 ratio), thence by induction to the secondary and on to the grid of the fifth tube, which is the second audio frequency amplifier. From the output of tube the greatly amplified current passes to the built-in loud speaker, where it is converted into an audible signal of great volume.

It will be noted that a jack is provided at this point for the use of headphones or an external loud speaker, the internal loud speaker being automatically cut out of the circuit on insertion of a phone plug. By-pass condensers of .0001 mfd. capacity are shunted across the primary and secondary of A. F. transformer, and the secondary of A. F. transformer.

The copper shield around the tuned radio frequency transformer, the cores of the two audio frequency transformers and the frame of the loud speaker are grounded to the shield of the set.

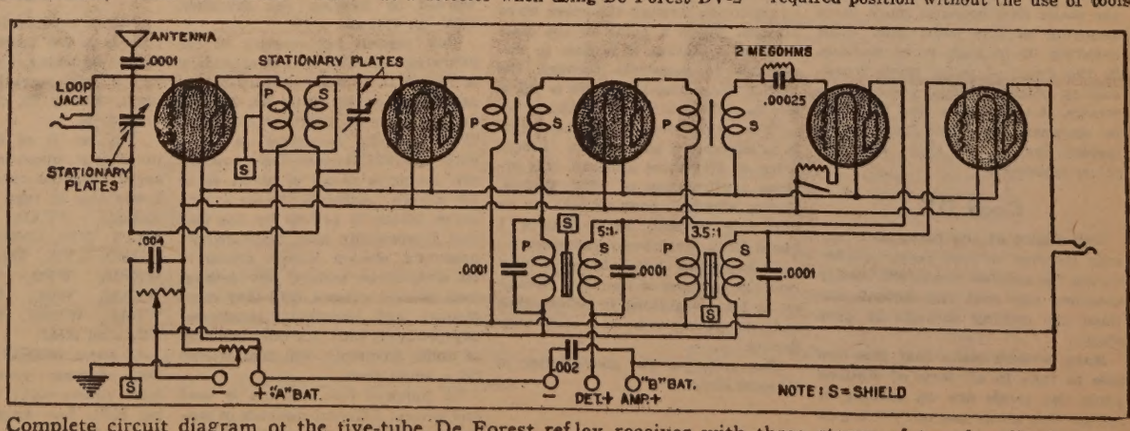
The grid bias of the first and second R. F. tubes is controlled by the 500 ohm potentiometer, which is marked "Sensitivity" on the panel of the set.



The man and his work. Roy A. Weagant, famous designing engineer, looks over his newest pet, the De Forest D-17-M.

One Rheostat Control.

The filament current of all five tubes is controlled by the 10 ohm rheostat. It will be noted, however, that a fixed resistance with a movable "jumper" is placed in the filament circuit of the detector tube The purpose of this resistance is to permit the use of a De Forest DV-3 dry cell tube as a detector when using De Forest DV-2 storage battery tubes as amplifiers. If DV-2 tubes or DV-3 tubes, as the case may be, are used in all five sockets, the "jumper" is swing around to make contact with two binding posts, thus short-circuiting the resistance. This little "jumper" is conveniently located at the right of the detector tube just behind the panel, and can quickly and easily be adjusted to the required position without the use of tools.



Complete circuit diagram of the five-tube De Forest reflex receiver with three stages of tuned radio frequency, detector, one stage of reflexed A. F. and one stage of straight A. F.

The four amplifier tubes are located to the rear of the detector tube, all sockets being amply cushioned. While the diagram shows the radio frequency tubes at the left, in the manufactured set the first right hand tube is the first R. F. tube, the second is the second R. F. tube, the third is the reflexed tube, and the fourth or left-hand tube is the second audio tube.

The shielded tuned R. F. transformer is located to the rear of the set, the two fixed transformers on a bakelite sub-base —which also contains the loop jack— between the detector and amplifier tubes, and the A. F. transformer are immediately below the cushioned sub-base which supports the detector tube.

The built-in loud speaker will be found at the rear of the set, the unit being so placed that adjustment of the diaphragm is easily and quickly effected by turning a small lever. A wooden projector of special design carries true reproduction of the sounds transmitted from the station with ample volume to the listeners through an artistic grill just below the panel.

Two battery compartments are provided, the left hand one being for the specially designed storage battery, or regular dry cells, and the right hand one for the 90 volts of "B" battery. Four heavy duty 22½ volt units, of the order of No. 2,158 Burgess, are recommended as being the most economical. Three of these batteries are placed vertically in the compartment and the fourth horizontally on top of the other three.

Layout Compact.

The whole layout is wonderfully compact, and the workmanship and efficiency of the set are unexcelled. The De Forest D-17 Radiophone is extremely sensitive and selective, and easy to operate. The two tuning pointers, which are actuated by friction drive reduction gearing, give razor-edge control and can be logged.

Although the De Forest D-17 is designed for efficient loop reception under all normal conditions, there are occasions on which an external antenna and ground, in addition to the loop, may be used with advantage. This applies chiefly to those cases where the receiver is located in a shielded building, or when Brother DX Hound wants extreme distance on the loud speaker.

The first step in tuning the D-17 is to set the filament pointer. When using DV-2 (storage battery type) tubes as amplifiers, turn filament pointer to approximately nine. When using DV-3 tubes as amplifiers turn filament pointer to approximately three.

When this pointer is once set—for say an evening's use—leave it alone, as it is not intended to be used for tuning. On succeeding evenings you may, however, have to use it in a slightly advanced position, due to the batteries running down through use.

A "rough and ready" way to tune in strong local stations is to next set the sensitivity pointer at about five, then using both hands, move the amplifier and receiver tuning pointers back and forth until a station is heard, after which the sensitivity pointer as well as the two tuning pointers should each be adjusted one way or the other to get best results.

In reaching out for weaker more distant stations, or picking out a particular one, much more care and patience is required. First, set the sensitivity pointer at about six or seven. Now—with the left hand swing amplifier pointer back and forth from zero to twenty, while at the same time the receiver pointer is being steadily but very slowly moved from zero to twenty with the right hand.

If while doing this you hear a bird-like chirp or whistle, you will know that you are on the "carrier wave" of a broadcasting station. This whistle rises and falls in pitch as you slowly swing the pointers and is thus easily distinguished from other sounds.

When you first pick up the chirping sound, stop moving the receiver pointer. Continue swinging the amplifier pointer back and forth past the chirping point, and, at the same time, slowly move the sensitivity pointer to the left until the chirping just stops.

If no carrier wave is picked up during this procedure in moving the receiver pointer from zero to twenty, the remainder of the scale should be explored. Do this by moving the receiver pointer steadily but very slowly to the right with the right hand, while swinging the amplifier pointer back and forth ten or fifteen points to either side of a point corresponding to the position of the receiver pointer.

After receiver pointer has passed forty-five and into the range of the higher wave lengths, the sensitivity pointer should be turned clear over to "Max." When you leave one station and start searching for another, do not forget to restore the sensitivity pointer to the proper starting point.

The Loud Speaker

A column or two for the Radio Fan: a place for his achievements and experiences; a friendly corner for the settlement of friendly arguments.
Conducted by MOE D. ENTLER.

IT would be a good move for the experimenter to construct a short wave receiver, because with such stations as KDKA, WGY, KFKX and the Radio Corporation's special station at Belfast, Me., transmitting on short waves, there is bound to be some fascination in picking them up on the lower waves.

The radio fan who is acquainted with the code can also experience the thrill of picking up some amateur transmitting from a great distance. It has been said that short waves will travel a greater distance than the higher waves, making it quite interesting to experiment with such a receiver to really determine whether such is the case.

One obstacle must be overcome to insure good reception on the lower waves, and that is to do away with the static that becomes much more annoying at this point than while listening in to high wave stations. In the event of many more broadcasting stations being pressed into service, it is probable that they will be assigned low wave lengths and thereby making the short wave receiver essential.

Good DX.

One glance at the many DX records received by the Loud Speaker during the last few weeks will readily convince one that the distant stations are coming through in good shape.

Many writers claim that they are able to tune in all sorts of stations while the locals are on, making it appear that static has not yet begun to reign.

Takes Exception.

"I read in your issue of March 28 where A. Fringes took J. B. Greenman to task for recommending a silent night, and advocated instead the building of a super set like his. Now don't you think it is about time you established a censorship in your column? To quote A. Fringes, he receives the following stations between the hours of 7 and 11 P. M. while the locals are going full blast on the loud speaker: WOS, transmitting on a wave length of 441 meters while WJZ is on, fourteen meters apart; CNRO, 435 meters, while WJZ, 455, is on, twenty meters apart; WLW, 422 meters, while WJY is on, seventeen meters apart.

"The seasoned radio fan knows this is bunk, and that while it is possible to penetrate through the lower wave lengths, where a point on the dials will kill a station, it is next to impossible to penetrate through the higher wave lengths, where it takes five to eight points on the dial.

"The prime purpose of this letter is to advocate a silent night. I have a log of fifty-three stations, also official confirmation of PTT, Madrid, Spain, which I don't believe to be authentic myself, as I believe I heard CYL, Mexico city, instead.

"I hope this letter finds its way into the columns of the Loud Speaker, as I am beginning to believe that radio is getting to be in a class with fishing."

The writer of the above letter is Edward Kane.

Static Eliminator.

"Please don't interpret this as a boost for *QST*, but in regard to your request for anti-static devices I wish to call your attention to the February and March issues of *QST*, wherein are described the McCaa anti-static devices, which seem to be the best attempts so far. In case you haven't read these issues, the static preventers are in the form of a vacuum tube repeater, which limits the loudest crashes to the same audibility as the signal. Although a signal static ratio does not sound very promising, it is in reality far superior to any present anti-static provention method.

"The device works best on a non-regenerative radio frequency receiver, which ought to make them very popular, and, in addition, is easily constructed and compact. An assembled preventer greatly resembles a stage of tuned R. F. in appearance, with no cumbrous loops.

"It seems that every one is interested in short waves these days, so I will give my experiences with same. In November, 1923, I built my first low loss short wave set, nearly six months before the present low loss craze began. During the amateur transatlantic tests I was rewarded by hearing one Britisher, 2NM, on this set.

"My present set consists of the following: An eleven turn secondary of No. 16 D. C. wire, primary of one and three-quarter turns No. 12 wire and a tickler of ten turns No. 20 D. C. wire. The secondary is tuned with a .00025 Bremer-Tully condenser, giving a range of about 45 to 130 meters. Although the set is sensitive, which is proven by the fact that I repeatedly hear Sixth District amateurs, station KDKA comes in on sixty-three meters, but without loud speaker volume. Still they come through with remarkable steadiness, day or night, and with only one step of audio frequency will comfortably fill a small room.

"A hundred foot antenna is used and several different methods of connecting it have been tried. First a one and three-quarter turn primary about two inches from the secondary in a regular Ambassador type circuit; second, a single circuit, with the capacity between the grid and ground omitted. This method is practical only when the battery leads are very short and the set well removed from radiators and water pipes, otherwise the receiver will fail to oscillate, the capacity to the ground being too great. In this third case the capacity of the batteries to the ground acts as a ground series condenser.

"Another interesting feature of short wave experimentation is that the aerial and ground don't have to be connected to the set, but only placed in the vicinity, because at such great frequencies the current bridges extremely minute capacities with ease.

"In a test, while 6CTO was being received, first the ground and then the antenna was removed. The signals were somewhat weakened, but still remained readable. 6CTO, by the way, is either in California or Arizona."

The above letter of interest comes from W. W. Pratt of East Orange, N. J.

In One Night.

"After reading some of the DX records in the Loud Speaker section of last Saturday, I would like to tell you of my reception on Saturday night, March 22, from 9 P. M. to 3:15 A. M.

"My set is of the three circuit tuner type operating on an indoor aerial. Besides tuning in the locals I was able to tune in the following stations, WCAD, KDKA, WBZ, WLIT, WIP, CNRO, WJJD, WGY, WREO, KYW, WLS, WGN, WQJ, WEBH, WPG, WCEE, WSAI, WTAM, WOC, WCCO, WCAL, WDAF, WMBF, WOAW, WFAA, KOA and KHJ.

"I have 'EKKO' proof of reception stamps, previously received from ninety-eight stations, including KFI, Los Angeles; PWX, Havana, and KOA, Denver.

"I have never used anything but an indoor aerial and have heard as far as Denver without any aerial at all."

Carroll A. Lovering is the fan who accomplished such wonderful DX work in an evening.

Thinks His Best.

William Shapiro writes that since he has not seen a record in the Loud Speaker columns as good as his, he will set a challenge for any one to produce a log as good as his.

On a one tube set he claims to have picked up KFI, KGO, WBAP, WFAA, KFRU, CNRW, 6KW, KFKX, WCAL, WHB, WDAF, WOS, WHO, WOAW, KFNF, WFAV, KSAC, WCCO, WOI, KFKB, WMBF and WQAM. He has verifications from both KGO and KFI.

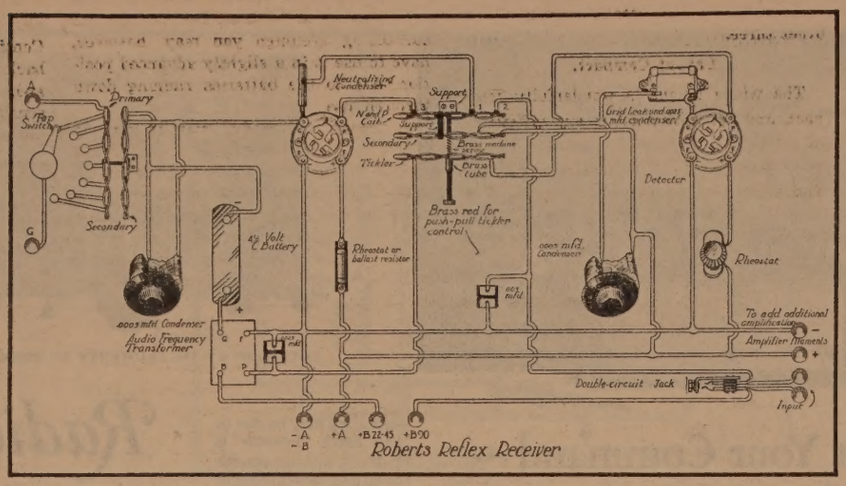
Using absolutely no aerial, only a ground wire ten feet long, he has picked up the following stations: KOA, KFRU, KFKX, WMBF, WHB, WDAF, WLS, WEBH, WGN, WBCN, WTAS, WCBD, WJJD, WTAY and WCEE. He thinks that this in itself is a good record. He lay stress on the fact that he could do much better work if his set would tune above four hundred and thirty meters without an aerial.

THE ABOVE ARTICLE AND COLUMN WERE DONATED BY ARTHUR SEIPERT BRONX, NEW YORK

Radio

The Roberts Reflex Receiver

BETTER reception is the one great desire of every member of the large family of radio fans who nightly turn their dials in search of ether-borne entertainment. Better reception is the allurement that causes thousands of fans to construct one set after another and, after experimenting with each one for a time, dismantle it and use the parts to build another with which he hopes to obtain greater range, increased selectivity, improved tone quality and perhaps more volume. These features, combined with low original cost and a minimum upkeep expense, may be said to characterize the perfect radio receiver.



A SIMPLY CONSTRUCTED SET TO WHICH AMPLIFICATION MAY BE ADDED

The one to be described here is neither the ultimate nor the perfect receiver for which a multitude of fans have thus far sought in vain, but it does combine more desirable features than any other home-made set known to the writer at the present time. It was developed by Walter Van B. Roberts, of Princeton.

It combines tuned radio frequency with regeneration capacity neutralization and reflexed audio-frequency amplification. It does not radiate howls and squeals, and its tone quality is excellent. It is selective, sensitive and requires but two tubes. Additional tubes may be added for increased volume, if desired, but the nucleus of the set consists of the two tubes connected as shown in the accompanying diagrams.

Tube Does Double Duty

The first tube functions both as radio and audio frequency amplifier, whereas the second serves as a detector. To this may be added push-pull or resistance-coupled amplification. Straight audio frequency is not recommended. The hook-up shown herewith, in connection with two stages of push-pull amplification, results in an exceedingly efficient four-tube set which is comparatively simple to construct and which produces volume equal to many five-tube receivers.

The following parts will be required:

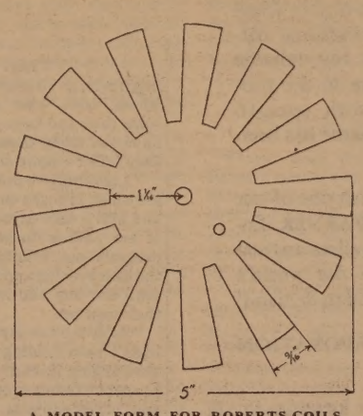
2 Vacuum tubes.
2 Sockets.
1 Rheostat.
1 Rheostat or ballast resistor—resistance dependent upon tubes used and filament voltage.
1 Double-circuit jack.
2 Variable condensers .0005 mfd.
2 Vernier dials.
1 Audio transformer, 5-1 ratio or less.
1 Tap switch.
5 Spider-web forms—see text.
1 Neutralizing condenser—see text.
1 Grid leak, preferably variable.
1 Grid condenser .00025 mfd.
3 Fixed condensers—.001, .005 and .0025 mfd.
1 4½-volt C battery.
¼ Pound No. 22 d. c. c. wire.
⅛ Pound No. 26 d. c. c. wire.
⅛ Pound No. 26 green-silk-covered wire.
1 Panel, 7x21x3-16 inches.
1 baseboard, 21x10x⅞ inches.
20 Feet bus wire.
1 Filament switch.
5 Binding posts, also wood and brass screws.

In addition to the above, two small strips of wood or insulating material 1x6x3-16 inches will be needed for supporting the spider-web coils.

Coils especially designed for use in the Roberts receiver are now available on the market and their use will insure perfect results; however, constructional details will be given for those who wish to wind their own.

Fans who have access to a ten-cent store can obtain the fiber spider-web forms; otherwise, the drawing accompanying this article may be used as a pattern by pasting it to a piece of heavy cardboard at least five inches square. Using the arrow point as the center, a circle is drawn outside having a diameter of five inches. A ruler is then used to draw straight lines extending the spokes outward from the inner circle to the outer circumference. This done, the form is cut out with scissors or a safety-razor blade, and the result is a spider-web form five inches in diameter having thirteen spokes evenly spaced. This is then used as a pattern for cutting out four more, equal in size and shape.

The next procedure is to wind the coils. The primary at the left of the drawing is wound first. It consists of 40 turns of No. 22 d. c. c. wire tapped as follows: 1st—beginning—2nd, 5th, 10th, 20th, 30th and 40th turns. This makes seven taps in all, but one—the beginning—is used as a connection to the coil, thus leaving six taps, which are to be connected to as many points of the tap switch. The arm of the tap switch serves as the other connection to the coil through the taps.



A MODEL FORM FOR ROBERTS COILS

The secondary coil consists of 45 turns of No. 22 d. c. c. wire. In winding these coils, begin at the center and, leaving about five inches for a connection, wind under two spokes and over the next two, under two and over two, until the entire coil is finished.

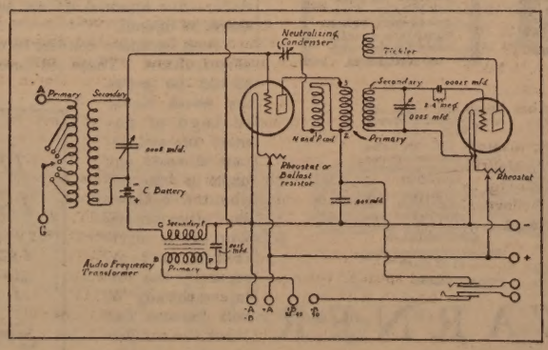
Before starting the N and P coil, place each of the spools of No. 26 green silk and white double cotton covered wire over two large nails so that the wire will easily unroll from the spools as the coil is wound.

Leaving about five inches for a connection, the beginning ends are tagged as follows: White, No. 1; green, No. 2. Both wires are then wound together on the form just as though they were one single wire. Wind under one spoke and over the next for twenty turns. This completes the winding. Leave five inches for making connections and cut the wire from the spools. The ends are then labeled as follows: White, No. 3; green, No. 4. It is important to label them correctly, as on this coil largely depends the efficient operation of the receiver.

After the wires are fastened in place by giving them an extra twist around the nearest spoke, an inch of white insulation is removed from the No. 3 end and the green insulation from No. 2 is scraped for a similar distance. These two ends, No. 3 and No. 2, are then twisted together. This then becomes the No. 2 terminal of the N and P coil shown in each of the diagrams and the original No. 4 becomes No. 3.

The secondary coil in the center consists of 45 turns of No. 22 d. c. c. wire. The tickler coil is wound with 18 turns of No. 22 d. c. c. wire. The secondary and tickler coils are each wound under two and over two spokes.

A support is next constructed for the coils. The primary and secondary are spaced half an inch apart by an adjustable screw. This screw passes through an upright held in place by a small block of wood at the base. Similarly, the N and P coil is permanently fastened half an inch from the secondary, but the tickler coil must be so arranged that it may be moved backward or forward.



HOOK-UP OF THE ROBERTS REFLEX RECEIVER

Making this arrangement is partly left to the ingenuity of the builder. A study of the photograph shows the method used by the writer. The tickler coil is attached to a hollow sleeve which slides over a screw projecting from the secondary coil.

The panel is next laid out and the holes drilled, after which the instruments are mounted following the plan indicated in the photographs. The primary and secondary must be mounted at right angles with the N-P, secondary and tickler coils. This is very important. The 7x21-inch panel is sufficiently large to allow room for a push-pull amplifier to be added later.

The neutralizing condenser may be homemade by sliding a brass sleeve or copper gasoline tubing over a piece of bus wire 3½ inches long over which a piece of spaghetti insulating tubing has been placed. There are a number of midget condensers on the market which will efficiently serve the purpose instead.

Either dry-cell or storage-battery tubes may be used in this receiver. The writer found it easier to neutralize the set with a —99 tube in the radio-frequency stage. A 60-ohm rheostat makes it possible to operate this tube direct from the 6-volt source. A 5-volt detector tube was used.

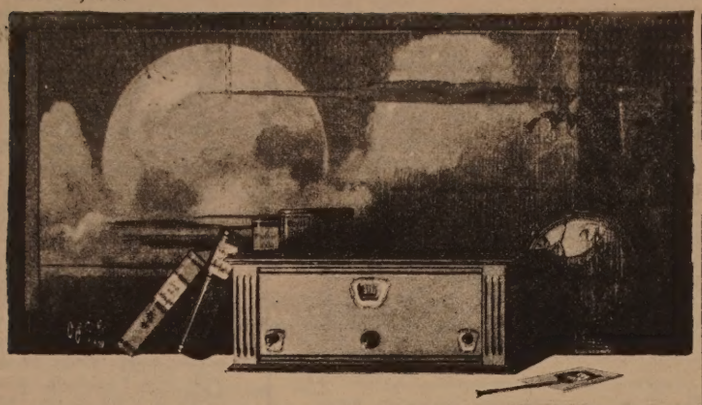
Operating Pointers

After the instruments are mounted and properly connected, the set is then neutralized. Place the switch lever on a center tap and the tickler coil as close as possible to the secondary, then light both tubes. Adjust the variable condensers until the squeal of a broadcasting station is heard. After tuning in the squeal as loud as possible, move the tickler coil away from the secondary and adjust the neutralizing condenser until the squeal vanishes and the incoming signals are clear.

The final adjustments of this receiver include experimenting with the various detector B battery taps between 16 and 45 until the proper voltage is found which gives best results with the particular tube in use. It is also well to either try various sizes of fixed grid leaks between 2 and 8 megohms or else adjust the resistance of the variable leak until the signals are clear. The C battery voltage should be varied.

Accidentally short-circuiting the neutralizing condenser places the entire B battery voltage across the filaments of both tubes. For this reason it is advisable to connect a .001 mfd. fixed condenser in series with the neutralizing condenser, thereby protecting the tubes from accidental burn-out. This is not shown in the hook-up, but it is listed under parts required and is an advisable precaution. It will in no way affect the operation of the set.

In some sets it may be necessary to ground the negative side of the filament lead to bring about stability. Excessive



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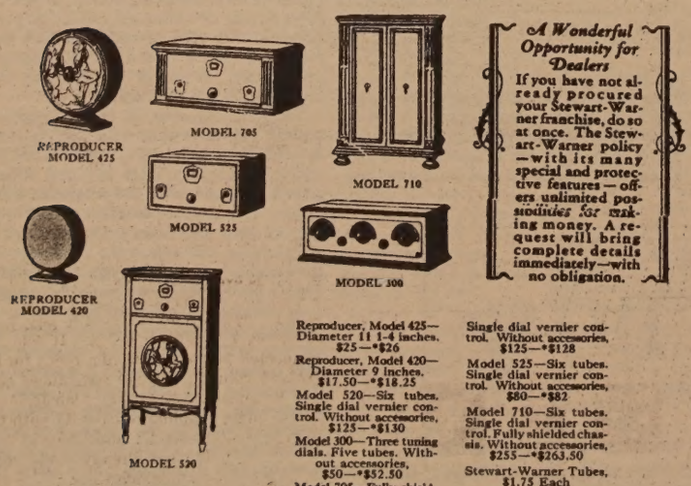

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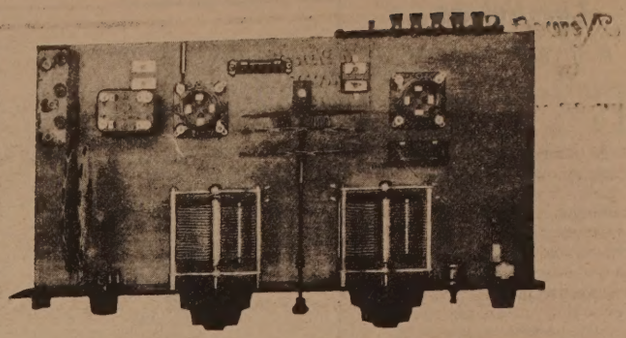


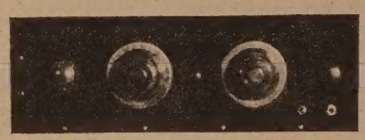
LOCATION OF INSTRUMENTS IN ROBERTS REFLEX RECEIVER

Radio

(Continued from Page 70)

squealing may be due to too much detector B battery, and no sounds at all may indicate either too low a B battery detector voltage or else an open circuit or a broken wire. Trying various sizes of fixed condensers across the secondary of the audio-frequency transformer and C battery may greatly improve the signal quality. Best results were obtained in the writer's set using a .00025 mfd. condenser. It brought about a slight increase in the volume and improved the all-around efficiency of the set.

STUART C. MAHANAY.



SUGGESTED PANEL LAYOUT

Tuning In Pays Kansas

They neighbor with their neighbors, go to church, plant and harvest wheat, corn, oats and sorghums, milk some cows and keep poultry. They should have got along these past few years, but they failed despite their frugality.

"Last winter we owned a little one-tube set which brought the college in fine. John and Mary were encouraged to share a pair of ear phones during a college-of-the-air program one evening. They came back the next evening and the next and the next, until our boy had helped them construct their own set.

"Soon the twenty-three-year-olds, who hadn't been holding their own at farming, were sitting in their living room listening to authorities on crops, cows, poultry, pigs and other subjects talk what they said sounded to them like common sense.

"Dean L. E. Call declared one evening that smooth-type-ear corn yielded an average of approximately ten bushels more an acre than the rough. He told why. This sounded convincing to John, who always put about fifty acres to corn and, according to custom, picked the rough type. Fifty acres times ten bushels, times one dollar—five hundred dollars saved right there, he figured.

"John became a convert to the science of agriculture. 'These old limestone hills should be growing sweet clover instead of sumac,' the soil expert shouted one night at him and about five thousand other farmers who, it is estimated, attend regularly the college of the air. 'It will pasture five times the number of cattle, besides taking nitrogen—the highest-priced fertilizer element—from the air and putting it in your soil.' That was more good news to John, and he fired a letter into the station's noonday question box, asking for more information and a bulletin about sweet clover which the college lecturer had mentioned.

"John was more or less amazed at the number of helpful facts which the college was able to contribute to his business. He told his neighbors what he heard, often calling them on the phone after a lecture. He treated his sorghum seed for smut at a cost of five cents a bushel and a saving of sixty dollars. He got his first stand of alfalfa seeded the 'radio way.' His spring pig crop was farrowed out on clean ground away from old lots contaminated with roundworms, the bane of his hog business; he fed them a balanced ration, and marketed at the time the college marketing specialist forecast the peak price."

It is paying this young farm family to tune in on Station KSAC.

Rural Schools Join In

MRS. JOHN, so Neighbor Jones reported, sold off her poultry flock, to start in fresh with certified stock bred for high egg production. She enrolled for the twenty-eight radio extension courses and received the printed lectures. Both John and Mary studied them, took the examinations and received certificates from the first college of the air.

Twenty per cent of the Kansas farmers have radios, and nearly all that number listen to the college station.

The noonday program, at which a question box and two short timely talks are featured, is considered the most valuable service. However, the response from the college of the air, an evening program, has been almost as great.

Another popular feature is the Housewives' Half Hour—the 3-H program—broadcast in the middle of the forenoon.

The experiment with a rural-school radio program appears to college officials as offering the greatest possibilities of all. Only a few dozen of the 10,000 rural schools in the state were equipped to hear the ten weeks' program, but from this number came such universal approval that a great deal of interest was awakened in equipping other schools. In fact, one county had a radio set in all its schools last fall. This experiment is being watched closely by educators.

ONLY A FEW 1973 BACK ISSUES OF THE HORN SPEAKER LEFT

The HORN SPEAKER..... 9820 Silver Meadow Drive, Dallas, Texas 75217 5

Radio

Newest Styles in Radio

THE 1926 model receiving sets displayed at radio shows throughout the country during the past several months bear conclusive testimony to the fact that the "revolutionizing" developments expected by many, and in anticipation of which countless purchases have been put off, have yet to make their appearance.

This should prove a welcome message to those who in the past wanted a radio receiver but deferred buying in the belief that whatever set they selected might lose its value and utility shortly afterward through the advent of a new and revolutionizing invention. They would then be in the position of having to operate an out-of-date set, inadequate to their needs, or else discard it and pay out more money for one of the newer types incorporating all of the latest improvements.

But such is not the case. Improvements have been made, to be sure, but simplicity is the keynote of the newer models. The principal changes which have been made are largely those of refinement. Single and two-dial control receivers had a much larger representation at the recent radio shows than ever before. A few were entirely without dials. The new cabinets are more attractively finished and the designs are more elaborate and varied, whereas the mechanical construction within is more rugged. Better tone quality, increased selectivity and greater ease of operation were the talking points stressed by those in attendance at every booth. It was also evident that prices are lower now than ever before.

Simplicity is the Keynote

On every hand it seemed apparent that manufacturers have turned their attention from the creation of new circuits to the simplification and improvement, wherever possible, of those which already have made a permanent place for themselves through months of satisfactory results. And with simplification has come the dressing of these new models in cabinets of pleasing designs which will blend harmoniously with other articles of furniture.

As to circuits, five-tube sets employing various forms of tuned radio frequency seem still to be the most favored by manufacturers. Some are using resistance-coupled audio-frequency amplification and this adds an extra tube, making six in all. Otherwise, with few exceptions, there have been no outstanding changes in the majority of those offered.

Quality of reproduction has come in for a large share of the attention and efforts of manufacturers both of sets and loud-speakers during the past twelve months. The public is coming to look for and demand what is destined to become a matter of paramount importance in the future—tone quality.

Some cabinets incorporate a built-in loud-speaker and, at the back, room is provided for the necessary batteries or power supply. Others were offered in unique and distinctively original creations. There were writing-desk console styles, round, square, rectangular and upright types, not to mention those modeled after period furniture designs.

There were countless varieties and styles of loud-speakers. Many manufacturers who in the past have confined their reproducer models to the horn type have this year added a cone speaker to their lines. Horn speakers of every conceivable size, shape, dimension and design were in evidence, although there seems to be a gradual tendency toward the concealed or cone type. However, the transitional period will probably cover a number of years.

Appearance, however, is more often of secondary importance when tone quality is considered. In the writer's opinion, greater advancement has been made along the lines of developing loud-speaker tone quality and naturalness of reproduction than in any other field of research during the past year.

There were many different makes of devices designed to dispense with A and B batteries. Some were single units. Others combined both under the one cover. There were receivers with these devices made a component part thereof, and to operate the set it becomes necessary only to attach it to the nearest electric light socket and adjust the dials for the desired signals.

Many battery eliminators were on view, but the success and satisfaction which each type will give could not be ascertained by a show-case examination. The proof of the efficiency of such devices lies in the actual testing, connected to a radio receiver and the light socket.

New Types of Battery Chargers

The representatives of these devices, however, made it clear that the manufacturers would guarantee satisfactory results when used with any standard type of radio receiver.

There were many different styles of A battery chargers. A new type of particular interest is one which delivers a "trickle charge." In other words, the battery is being charged at a very low rate at all times except when it is actually supplying energy to the radio set, in which case the charger is disconnected from the circuit. Low-capacity storage batteries especially adapted for use with this charger are now being offered by practically all of the leading battery manufacturers. Both the battery and charger are so small that they can be put into the usual dry-cell compartment of any late-model receiver.

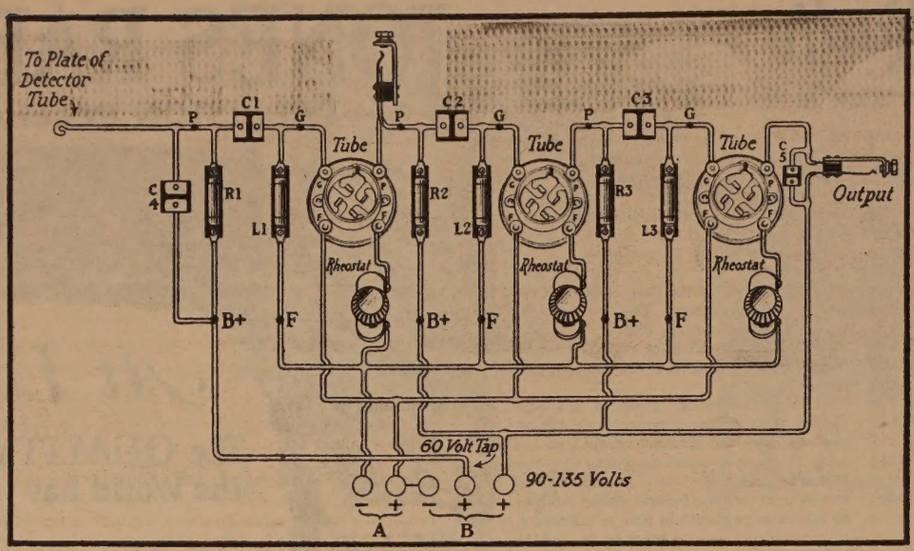
Many Accessories on View

There were countless varieties and styles of accessories. Fancy and plain vernier dials, new-fangled antenna insulators, switches, kits of parts, and lead-sheathed antenna wire intended to be buried in the earth outdoors or in the basement and for which great claims were made.

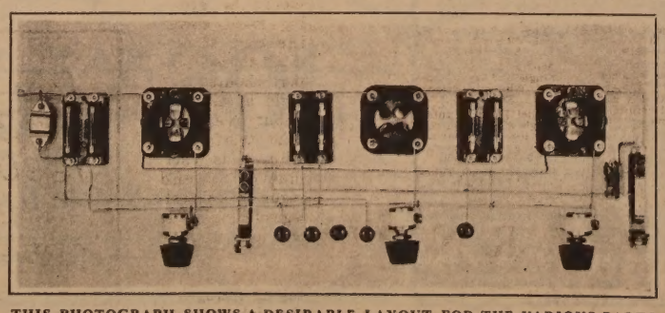
One of the leading manufacturers of tubes recently announced a number of new types which will fill a long felt need. One of particular interest is designed to be used in the second stage of an audio-frequency amplifier in place of the usual amplifier tube in order to bring about great amplification with a minimum of distortion. Higher B battery voltages may then be used.

The visitor leaves one of these exhibitions with a feeling of assurance that the only changes which are now taking place in the radio world are those gradual ones which characterize the development of every scientific achievement that benefits mankind in direct proportion to the degree to which it is perfected.

STUART C. MAHANAY.



A PICTURE DIAGRAM SHOWING THE CONNECTIONS FOR A RESISTANCE-COUPLED AMPLIFIER



THIS PHOTOGRAPH SHOWS A DESIRABLE LAYOUT FOR THE VARIOUS PARTS

Improving Your Amplification

PRACTICALLY every radio receiver employing three tubes or more makes use of audio-frequency amplification. Although this seems like a big term, the system it designates is really simple in its operation. "Amplification" is a word which implies increasing or "boosting." The apparatus which brings about amplification is called an "amplifier." Therefore an audio-frequency amplifier is a device which increases the volume of signals at audio frequency.

There are two kinds of frequencies—"radio" and "audio." Radio frequency is the term applied to frequencies above 10,000 per second and to which the human ear does not respond. Audio frequencies are those below 10,000 to which the ear can respond, after which it transmits the sensations to the brain and we speak of the result as hearing.

In every amplification system, some means must be provided for "coupling" between each tube. In most receivers audio-frequency transformers are employed. However, this method has its disadvantages. Distortion is usually present to a greater or lesser degree in every transformer-coupled amplifier.

This article deals with a system that is not new, but which is rapidly coming again into popular favor because with its use distortion is practically unknown. It makes use of two resistances and a fixed condenser properly connected in place of each transformer.

The advantage of this method over transformer-coupled systems is that the signals are purer and practically free from distortion. The resistance units are inexpensive and easy to obtain. Although additional B batteries are necessary, if best results are to be obtained, the operating cost of the set is really not increased, for the B battery current consumption is lowered when resistance-coupled amplification is installed. A 3 or 6 volt C battery at F below L3 in the diagram will prolong B battery life. The amplification per stage is less than when transformers are used. For this reason three stages of resistance-coupled amplification will give approximately the same volume as two of audio.

Installation is Simple

Those who wish to experiment with the system will have little difficulty in giving it a trial, for it is only necessary to loosen the four transformer binding posts, lift it out of the set and replace it with a condenser and resistance units of the proper size. The connections are shown in the picture hook-up accompanying this article. If care is exercised in making the change, a vast improvement in tone quality will result. It may be used with any type of receiver except a reflex. It can be connected to the output of a reflex for increased volume, but the resistances cannot be substituted for the transformers.

The plate coupling resister R1 with the isolating condenser C1 and the grid leak L1 can be purchased already made up in a compact unit on which the G, P, F and B terminals are indicated to facilitate connection in place of an audio-frequency transformer. Likewise the R2, C2 and L2 and the R3, C3 and L3 units can be purchased ready for installation. The illustration shows an assembled amplifier

using these units. Variable resistances of the proper size may be used, but they will cost more, take up more space and give no better results.

An entire three-stage amplifier unit may be purchased completely wired and ready for use when the tubes, loudspeaker and batteries are connected. This greatly simplifies the process. Most of the necessary parts, except perhaps the resistances, will be found in the average experimenter's shop or laboratory. They are as follows: 3 sockets; 3 tubes; 3 plate resistors, R1, R2 and R3 of 100,000 ohms each; 3 grid resistors, L1, L2 and L3 of 1, ½ and ¼ megohm each, respectively; 3 fixed condensers, C1, C2 and C3 of .006 mfd. capacity; 2 fixed condensers C4 and C5 of .002 mfd. capacity; 3 rheostats or one ballast resistor; 2 jacks, one open and one closed circuit; 5 binding posts; 1 baseboard 6x18x½ inches; 1 panel 7x18 inches—optional.

Ninety volts will operate the system, but an additional 45-volt B battery is required for best results. The detector plate voltage also must be increased to a value somewhere between 60 and 90 to compensate for the voltage drop across the resistance R1. The proper tap for the particular detector tube in use can best be determined by experimentation.

Radio

(Continued from Page 82)

Any type of standard amplifying tube may be used. A "soft" tube is not suitable as a detector, however, as such tubes will not function on the high plate voltages required for resistance-coupled amplification.

Dry-cell tubes may be used. However, the amplification will not be so great as when 5-volt quarter-ampere tubes are employed. Even better results will be obtained by using a new type of tube designed especially for the purpose and recently placed on the market by a number of manufacturers. They operate on 6-volt filament current and have an unusually high amplification constant which is greatly to be desired of the tubes in this class of work.

If hand-controlled rheostats are employed, a voltmeter or ammeter should be used to keep the filament current at exactly the proper value designated by the manufacturer of the tube. An alternative, however, is to use a ballast resistor, which, in this case, performs in just as efficient a manner as one or more rheostats and has the added advantage of requiring no further attention.

Additional information concerning the addition of resistance coupled amplification to any particular type of receiver may be obtained by writing to the Radio Editor.

MEET OTHER COLLECTORS, ADVERTISE IN THE HORN SPEAKER SOON

October, 1927

Plug In—and Tune In

30 Days Free Trial

Now! A Real Electric Radio Set

Three Year Guarantee

Shipped direct from our factory at ROCK BOTTOM PRICES
Costs Less Than Most Battery Sets

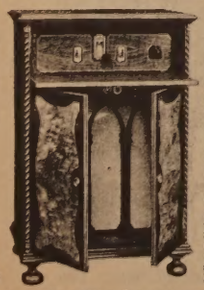
No Batteries, Chargers or Eliminators
No Acids; No Liquids—Plug In—Press Button—Tune In

Agents! Dealers! Big Profits!
Make big money taking orders for Metrodynes. All or part time. Metrodyne All-Electric Radios are in a class by themselves. Unequalled for quality and performance at the price. Demonstrate at home and take orders. Lowest wholesale prices. Your demonstrating set on 30 days' free trial. Write today for further details.

Metrodyne
ALL ELECTRIC RADIO

7 Tubes—Single Dial Set

At last! The radio you've dreamed about! If you have electricity in your home you can now enjoy long distance reception without the need of any batteries, chargers, eliminators, etc., with this genuine batteryless radio set. Simply insert the plug in socket, press switch button and "tune in." You could not get a better value in a radio set than the Metrodyne All Electric.



GORGEOUS CONSOLE ALL-ELECTRIC RADIO
Genuine walnut cabinet, in beautiful, two-tone finish. Built-in genuine Metro Cone large size speaker. Brings in programs with great volume, reproducing the entire range from the lowest to the highest notes with remarkable clearness and distinction. All metal parts finished in old gold. Wonderful electric radio, in a cabinet that will beautify the appearance of any home.

Beauty—Efficiency—Dependability

100% Electric Radio. Only the highest quality low loss parts are used throughout. Solid walnut cabinet, beautiful two-tone effect, with handsome gilt metal trimmings. Has electrically lighted dial. Log stations in the dark. Only one dial to tune in all stations. Excellent tone qualities—wonderful volume—very selective. Size of cabinet, 28x13x10.

Costs Less Than Most Battery Sets

Do not confuse the Metrodyne electric radio with ordinary light socket sets, because the Metrodyne is truly an All Electric Radio—consumes less than 2c worth of power a day. Comes to you direct from the factory. Its low cost brings it down to the price of an ordinary battery set.

Write Today! We are so confident that you will be delighted with this wonderful, easy-to-operate Batteryless Radio that we offer to ship it to your home for THIRTY DAYS' FREE TRIAL—you to be the judge. A postal or letter brings complete information. WRITE TODAY!

METRO ELECTRIC COMPANY
2165 N. California Ave. Dept. 667 Chicago, Illinois

JONES RADIO
The PRECISION Receiver

At Last—
The QUALITY receiver the World has waited for!

A Model for Every Home

The model illustrated above is J-175: a 6-tube receiver priced at $175

Model J-175C
Same with Loud-Speaker Table
Price . $250

Model J-100B
5 tubes
Price . $100

Model J-100C
Same with Loud-Speaker Table
Price . $150

Model J-75B
5 tubes
Price . $75

Also De Luxe Model J-175D
Upright Cabinet Period Design
Price . $475

(All prices quoted less accessories)

HERE, at last, is the Radio Receiver you have waited for.

Not a trick circuit—but the time tested principle of Tuned Radio Frequency PLUS perfect precision in design, construction and coördination of parts.

PRECISION is the secret of dependable radio reception. Perfect precision in every part reduces loss of energy—makes it possible to pick up, and *build* up, weak signals from far distant stations, and to reproduce such signals with amazing volume, perfect clarity and fidelity to tone.

It has remained for Jos. W. Jones, for 28 years an inventor and manufacturer of precision instruments and parts, to produce the standardized, precision-made radio receiver that the world has been waiting for.

Hear it TODAY! Judge for yourself its Hairbreadth Selectivity—its Delightful Tone—its matchless Ease of Operation.

A demonstration will prove, beyond the shadow of a doubt, that here at last is a Radio Receiver you can depend upon for uniformly dependable performance.

Write today for descriptive folder and the name of a nearby dealer, who will gladly demonstrate and install a Jones Radio Receiver in your home, at small cost, and on convenient terms of payment.

Manufactured by
JOS. W. JONES RADIO MFG. CO., INC.
40-46 West 25th Street
New York

Mr. Jones is the inventor of the famous Jones Speedometer, the Jones Phonograph Record Process, the Jones Electric Drill, the Motrola, the Jones Tachometer, the Jones Taximeter—and many other precision instruments. More than 300 patents have been granted him.

JOS. W. JONES
RADIO
TRADE MARK

PRECISION-MADE RADIO RECEIVERS

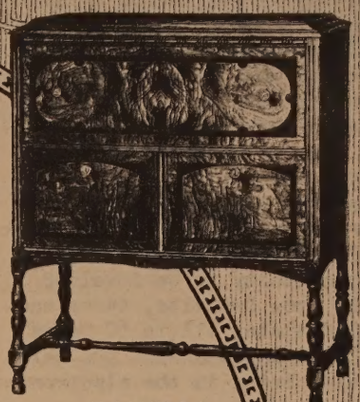
DEALERS: Get particulars of our interesting Franchise Agreement NOW. Valuable territory still available. Write or Wire.

1926 ad

THE SATURDAY EVENING POST 147

POOLEY
RADIO CABINETS *with* ATWATER KENT RADIO

Model 1900-R-2
Finished in American Walnut, with built-in Pooley (patented) Floating Horn and Atwater Kent Receiving Set. Prices complete, without tubes and batteries,
$135 to $160



Model 1600-R-2
Finished in English Brown Mahogany or American Walnut, with built-in Pooley (patented) Floating Horn and Atwater Kent Receiving Set. Prices complete, without tubes and batteries,
$175 to $200

Look for the name "POOLEY"
Here are good reasons

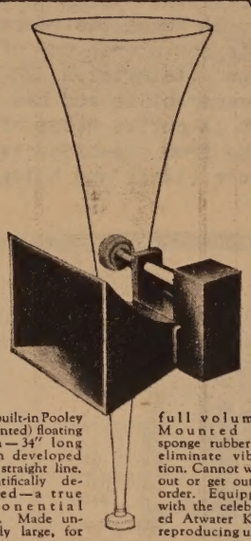
THERE'S far more to a radio cabinet than just an ornamental setting for a radio receiver.

It must have a good speaker. The built-in Pooley floating horn is exceptionally large, scientifically designed, constructed of choice spruce, the wood of fine violins. It rests on pads of sponge rubber to stop vibration. Size, design, mounting—give Pooley its incomparable golden tone.

The set must be expertly installed—as Atwater Kent Radio is installed, wired and tested in the Pooley factory.

The cabinet for a good set must be good itself, good through and through. The design and quality of Pooley cabinet work meet the exacting standards maintained for Atwater Kent Radio. Pooley Cabinets are made like the finest furniture—sturdy, enduring, beautiful.

This is a cabinet radio you will value more, the longer you live with it. Don't risk disappointment—hear the Pooley horn, examine Pooley Cabinets, before you select your radio. *Look for the name "Pooley" before you buy.*



The built-in Pooley (patented) floating horn—34" long when developed in a straight line. Scientifically designed—a true exponential horn. Made unusually large, for full volume. Mounted on sponge rubber to eliminate vibration. Cannot wear out or get out of order. Equipped with the celebrated Atwater Kent reproducing unit.

These views show the fine workmanship of Pooley Cabinets, in the joining of top and side panel at the left, and below, the dowelling of stretcher to cross piece. All construction is of the same high order—joints mortised or dowelled and held together with furniture maker's glue applied hot. A Pooley Cabinet, like the fine furniture it is, will last a lifetime.

Mr. Atwater Kent says:

"The Pooley Radio Cabinet is approved for Atwater Kent Radio because of the design and quality of Pooley cabinet work and because of the tone qualities of the Pooley built-in floating horn. Both meet the standards we set and maintain for Atwater Kent Receivers and Speakers."

(Signed)
A. ATWATER KENT

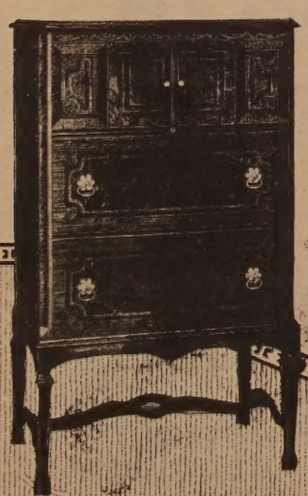
All the Pooley Radio Cabinets and Pooley Cabinet Speakers are shown and described in our new catalog. Send for it.

THE POOLEY COMPANY

1664 Indiana Avenue Philadelphia, Pa.

Beware of imitations—look for the name "Pooley" before you buy

Prices slightly higher west of the Rockies and in Canada. Canadian Pooley Radio Cabinets are manufactured by Malcolm and Hill, Ltd., Kitchener, Canada.



Model 1700-R-2
Finished in American Walnut or English Brown Mahogany, with built-in Pooley (patented) Floating Horn and Atwater Kent Receiving Set. Prices complete, without tubes and batteries,
$240 to $320

Model 1300-R-2D
Finished in American Walnut or English Brown Mahogany, with built-in Pooley (patented) Floating Horn and Atwater Kent Receiving Set. Prices complete, without tubes and batteries,
$225 to $305

LETTERS

Dear Jim:

Enclosed you will fine another year's subscription for THE HORN SPEAKER, which I enjoy a great deal, reliving the years behind me. Having been in the radio and telecommunications profession all my life, starting in 1921. Now being retired and enjoying a few hobbies, which include antique radio, telegraph, phonographs, automatic musical instruments and antique cars as well as an antique steam train. All these keep me occupied through the various seasons.

Looking back thru the years, radio communication progress has been phenomenal. During my era I have had the opportunity to be involved with spark, arc, h-f alts, tubes and lastly solid state, all in 60 years or less. Just imagine what the next 20 years will bring in the electronic era.

I have been collection for the last ten years (prior to that I didn't have time) and have a respectable radio collection of about 100 sets, some ham gear, some test equipment and some very old telegraph equipment (printer with piano key board) made in France.

In your last issue of THE HORN SPEAKER on pp. 2, the ad of the C-10 Super-Het., there was no mention that it was a Nordon-Hauck Navy Super. I owned one in '27 or '28. The set has a separate unit for the power supply and last stage of audio pp. 10 or 50. However I was not aware of the fact that Charles Leutz had anything to do with the Nordons or Haucks. Hauck was a family friend. But it might be possible, your archives perhaps will tell. The know how those days were twelve or fifteen individuals. It would be interesting if you could run an article about the Nordons and Haucks. There must be a few of these sets around yet (wish I had mine).

Enclosed is an ad for you to run in the next two issues. Good luck Jim.

Cordially yours,
Route 1
Marlboro N.J. 07746

Dear Mr. Cranshaw:

Enjoyed reading my first copy of THE HORN SPEAKER, and want to write and ask about doing an article. First, let me tell you a little about our Broadcast Museum (Brochure enclosed). It began two years ago as a tribute and storehouse of our own stations' (television, AM and FM radio) memorabilia and has expanded into an entire house of artifacts dating from pre-broadcast into the future (laser and holographs). I have tried to show and explain the concepts and technology in experiments and demonstrations, rather than just put out a lot of old sets to see. Local colleges and our own engineers have built these displays; and we believe we have a most unique concept. Frank Blair, who had his first job at WCSC Radio, has narrated our Tourtape which is called "From TomTom to Telstar."

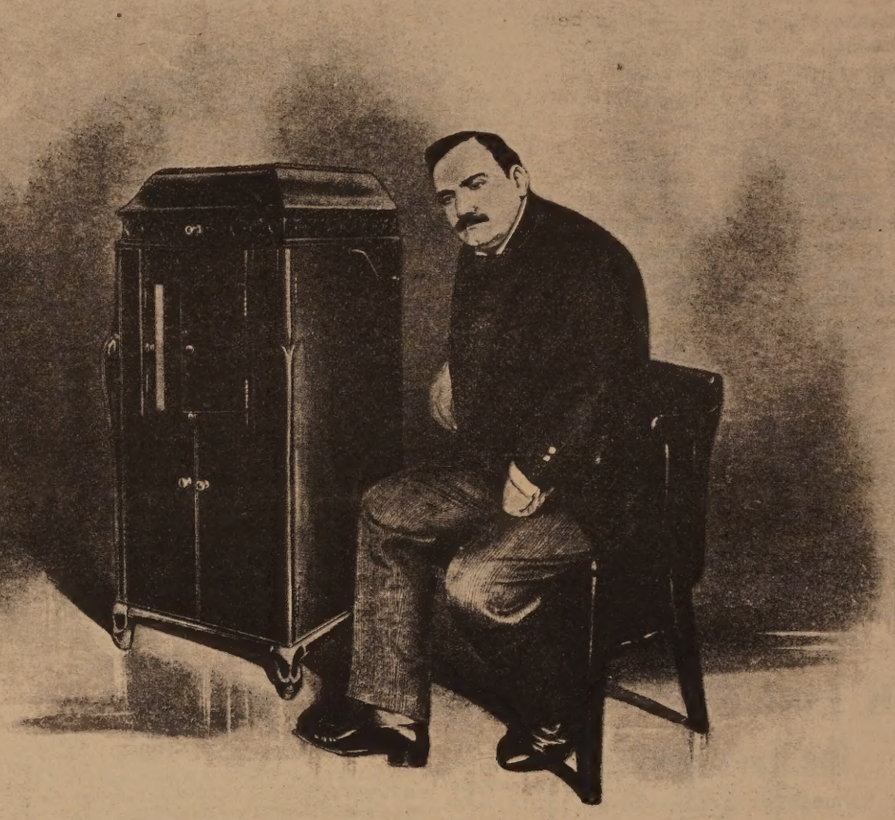
We have recently acquired a magnificant collection of early gramaphones, phonographs, and Magic Lanterns; and I am now in the process of researching and writing on this phase as an addition to the tour tape. Prior to opening this new room, we concentrated on just radio and television.... past, present, and future. I am just fascinated and intrigued by the rivalry, patent infringement, and court battles at the turn of the century over processes of recording sound.

In our Museum, we feature the development of Edison's cylinder phonograph as listening parlor entertainment, the traveling entertainer, and business machines and schools. We show Berliner's disc development and the battle of the spindle size. The story of the picture of Nipper, the RCA trademark is fascinating. (Did you know that the artist first painted Edison's machine and offered it to him; but Mr. Edison said he didn't

What Are The Air Waves Saying?
Caught by 2PI
(Zeh Bouck)
HEY-HEY!! COME HERE EVERYBODY! QUICK!!!!
HELLO AMERICA-THIS IS LONDON, ENGLAND----
AND THEN!!!
---- BEING REBROADCAST BY WJZ--
TELEGRAM AND EVENING MAIL RADIO
Saturday, March 21, 1925.
Not As He Seems
WHY MR. JONES! HOW LONG SENCE YOU BEN THIS WAY?
THE DOOR BELL RANG WHILE ABSENT MINDED JONES WAS TINKERING WITH HIS RADIO
THE SUN RADIO SECTION, SATURDAY, APRIL 4, 1925.

Victor-Victrola

Victor-Victrola XVI
Mahogany, $200
Quartered oak, $200
Circassian walnut, $250
Horn and all moving parts entirely concealed. Music made loud or soft by opening or closing small doors.
The cabinet contains albums for 150 records and drawer for accessories. All metal parts heavily gold-plated.
Other styles of the Victor from $10 up



Caruso listening to his own voice on the Victrola

IF only a few of the world's greatest artists made records exclusively for the *Victor*, it might signify little. But when such famous singers as Caruso, Calve, Eames, Farrar, Gadski, Homer, Melba, Plancon, Schumann-Heink, Scotti, Sembrich and Tetrazzini *all* make records exclusively for the *Victor*, it is not only a splendid tribute to the high musical qualities of the *Victor*, but the most conclusive proof of its all-around superiority.

Prove it for yourself. Hearing is believing. Any *Victor* dealer will gladly play any *Victor* music you want to hear.

Write to us for complete catalogues of the *Victor* and *Victor-Victrola*, and *Victor Records;* also name of the nearest *Victor* dealer.

Victor Talking Machine Co., Camden, N. J., U. S. A.
Berliner Gramophone Co., Montreal, Canadian Distributors.

To get best results, use only Victor Needles on Victor Records.

A complete list of new Victor Records for May will be found in the May number of Munsey's, Scribner's, McClure's, Century, Everybody's and June Cosmopolitan.

invent his machine for "dogs" to listen too.....and chose another ad of a little old man and a little old lady. We have both pictures which can be copied) --Have you ever seen a folding horn that packed into the top of a case and made a package about 12 inches square by 4 inches deep? It was great for safari's in Africa...incase you wanted to take your culture with you backpacking. We could take pictures of many of the old horn speakers and we have some great ones - like a solid mahogany, the usual brass and morning glory, puls other hand-painted varieties. We can show and explain the exponential horn with a cut-away in the Museum. And the Magic Lanterns are a thing of beauty. We have models using kerosene, gas, carbide and hand-painted "slides"...plus post card projectors, the Kinetoscope -- the great beginnings of video?

Not being aware of what articles might have covered in the past, I thought I might inquire if you have an interest in my developing an article about any of the foregoing. Please let me know if you are interested.

I hope you will stop by the WCSC Broadcast Museum when you are in this vicinity. I'd like very much to show you around.

Sincerely,
Patsy M. Hicken
Museum Director
P.O. Box 186
Charleston S.C. 29402

Editor...Speaking for the readers, I am anxious to read your articles.

BACK ISSUES

The Horn Speaker

All 10 back issues for 1973...$8.00
Single issues...$1.00 each
All 10 back issues for 1974...$6.00
Single issues...$.75 each
All 10 back issues for 1975...$5.00
Single issues...$.75 each
All 10 back issues for 1976...$5.00
Single issue...$.75 each
Any single issue of 1977...$.75 each
Later, we should have complete volumes for 1972, first year.

The Horn Speaker

Box 12 Kleberg, Texas 75145

Rates for THE HORN SPEAKER
One year.....$5.50
Two years.....9.00
Special rates for one year (mailed in envelope)
First class.....$8.50
Air mail.....$12.00
Foreign air mail...16.00
Mail address: THE HORN SPEAKER
Box 12
Kleberg TX 75145

Dear Sir:

Please send me information if you have any on construction of a Browning and Drake radio coils and all of the equipment needed to make a complete set.

I will send the money needed to cover the cost when I get the information from you whether you can help and if not please let me know of anyone that could, no matter what the cost would be.

Yours truly,
John P. Asanciac
10516 Bensley Ave.
Chicago IL 60617

EDITOR...No charge for information.

FREE PUBLICATION

ROARING 20's is a three-year-old publication about collecting and preserving vintage radios. The next issue, they say, will be sent to anyone who sends a self addressed stamped envelope to: Floyd Paul, 1545 Raymond, Glendale CA 91201.

THE NEW PHONOGRAM FOR SEPTEMBER, 1907

REPEATING PHONOGRAPH CLOCK

A DOWNTOWN clockmaker has worked out a repeating phonograph clock, which in his belief will in a large measure supplant the old style of bell repeaters. His mechanical arrangement consists of a pair of cylinder records on which have been recorded the hours and each five minutes of the day. These are moved along a bar by clock work, and when it is desired to know the time, the pressure of a button throws the diaphragm into place, the record revolves and announces the time after this fashion—"two thirty-five." He says it is only a matter of mechanics to produce a clock that at the proper time in the morning will release a weight that will lift the clothes off a bed and at the same time call out, "John, it's time to get up. Hurry on now, the breakfast is on the table and all getting cold. Come on, get a move on you, etc.," with such repetitions and variations as will be most pleasing and effective in assisting the slumberer in throwing off his torpidity.—*Talking Machine World.*

DIFFICULT TO PRONOUNCE WORDS

FEW people know how difficult it is to pronounce some words to a talking machine so that they will be plainly heard in the reproduction, says *The Sound Wave.* One leading article declares that the word "thrice" is his shibboleth. That which reached the ear in the reproduction unless the greatest care was taken, was the word "ice," which, of course, was not the one desired. The "th" sound is very difficult and never loud. The "r" is also hard to record clearly unless it be rolled.

Music may be termed the universal language of mankind, by which human feelings are made equally intelligible to all.—*Liszt.*

Little grains of dust
On the sapphire fixed,
Make the music sound
Altogether mixed.
Little specks of dirt
On the the waxen roll,
Is not the way to keep
Your Records good and whole.

THE NEW PHONOGRAM FOR SEPTEMBER, 1907

9629 Hungarian Dance, No. 2 — **Edison Hungarian Orchestra**

This Hungarian dance by the celebrated composer Brahms, is a companion to our Record No. 8502, "Hungarian Dance, No. 1," and is full of that strange, wild, fascinating music so characteristic of beautiful Hungary, and so different from any other nation's melodies. A very pleasing effect is obtained by the introduction of the Hungarian cymbals.

9630 Theodore — **Edward M. Favor**

The amusing words and bright, catchy tune of this new comic song by Vincent Bryan will bring it into immediate popularity. Although our strenuous President is the subject, it is by no means a political song and should be as much liked by Democrats as Republicans. Mr. Favor, fresh from his triumphs in "Fascinating Flora" at the Casino Theatre, New York, sings it in his customary clear, vigorous manner. He is orchestrally accompanied. The chorus:

Theodore, the peaceful Theodore
Of all the rulers great and small,
He's first in peace, he's first of all in war,
He's in demand in Yankeeland, Hurray for Theodore.

9631 Many's the Time — **Collins and Harlan**

This is one of those amusing coon duets which these two artists render inimitably. Mr. Henry Brown has been separated from his beloved for some time and when he returns he finds that love, if not exactly blind, is at least shortsighted, for she does not remember him at first. It all ends up happily, however, and they decide to get married. The words and music are by Rose and Fischer. Orchestral accompaniment.

9632 When Someone Really Cares — **Irving Gillette**

This sentimental song, the words of which are by Mabel Davies and music by William Cahill, is sympathetically sung, with an orchestral accompaniment. The music and words are suitable to the theme and it should have a warm reception among lovers of sentimental ditties.

Club News

The next meet of the Niagara Frontier Wireless Association is set for April 15th at the Old Amherst Colony Museum, 500 Smith Rd., East Amherst N.Y. 14051. More information with pictures next month.

ZON-O-PHONE—Type B. No 60.

Same as Type A except that the sides of the cabinet are of oak, with heavy raised panels, equipped with japanned steel body, burnished brass bell amplifying horn, new model V sound box and two hundred needles.

The ZON-O-PHONE is not the GRAM-O-PHONE.

And when the Zon-o-phone once got in its work, the poor old Gram-o-phone was out of the running.

Please note that for the purpose of this article the term Zon-o-phone implies and includes,

1.—The Zon-o-phone machine itself.

2.—Zon-o-phone records made by the secret and exclusive Zon-o-phone process;

3.—Zon-o-phone machines and Zon-o-phone records used in combination.

Thus defined, The Zon-o-phone stands for what in the grand essentials of

Clearness,
Brilliancy,
Range,
Power,
Conformity to the original,
Freedom from scratch,

is absolutely the highest stage of development yet reached by mechanism in reproducing sound.

WORDS FROM A ZONOPHONE BOOKLET, ABOUT 1900

MART

Classified ad rate: 6¢ per word.
Photo ads: $2.00 extra.
Deadline: 20th of the preceding month.

MISC.

"RADIO AGE," a radio magazine devoted to wireless and early broadcast eras. Contains interesting articles written by collectors, articles published in early radio magazines, lots of reprints of famous radio ads, and a classified section for buying or selling radio and electronic items. Subscribe at $7.50 per year for ten issues. Mail check or money order to Radio Age, 1220 Meigs Street, Augusta, Georgia 30904.

FOR SALE OR TRADE

OLDE TYME RADIO PARTS FOR SALE:
Power transformer (brand new) $10.
Thordarson, type 24ROZU
Pri: 117VAC
Sec.1: 700VCT @ 70 ma
2: 5VAC @ 2A
3: 6.3VAC @ 2.5A
Filament transformer (brand new) $5.
Pri: 117VAC
Sec: 2.5VAC @ 10A
Tuning dial belts $2. ea.
Zenith cloth fabric style send radio model No. and old belt or belt demensions.
Sun Gun type lamps (candlelabra base) $2.50ea.
Photo lamps
Olde Tyme battery cable $1.00/ft.
Universal battery cable in brown knitted cloth sheath. This cable can handle Olde Tyme battery sets using up to 10 conductor leads. Just use as many conductors needed and cut off rest.
Electrolytic capscitors
2 uf @ 150V .50ea.
40-80 uf @ 150V 1.00ea.
12-12 Uf @ 450V (can type
8-8 uf @ 450V screw mount)3.50ea.
All prices are as listed above plus shipping. Howard Granoff, Olde Tyme Radio Company, 2445 Lyttonsville Rd., Silver Spring MD 20910.

RIDERS RADIO MASTER INDEXES: Vols. 1 to 15 $12.50: Vols. 1 to 23 $15.00: Vols. 1 to 20 $14.00: EARLY RIDERS Vol. 1 1919-1927 covers all battery sets, 200 pages, $17.50.
RADIOLA BATTERY SET SERVICE MANUAL 1922-1927 covers all battery sets 85 pictures & diagrams $5.00.
RIDERS Vol. 1 in 16 parts $5.00 each, 50 to 70 pages each, order by manufacturer parts 2 and 11 covers AK & RCA other parts cover 2 or more manufacturers.
NEW STYLE WD11 bases $6.00 per pair. Send SASE to K. Hanson, 3403 Broadway, Long Beach CA 90803.

FOR SALE OR TRADE

ANTIQUE TELEVISIONS, 1930s - 1940s large quanity. Over 50 sets. 3" Pilots. 7" Hallicraftors. RCA 630s. Will ship to you. Send $1.00 for picture. Charles Seidel, 925 Starlite, Grants Pass OR 97526. Telephone: 503 476-1078.

BLANK BAKELITE PANELS - Cut to size, 1/16" to 3/8" thick. Fabricating and engraving services available. SASE for pricing sheet. Parsons, WB1BVO, 22 Forest St., Branford CT 06405.

TUBES brand new, not surplus! These popular oldies are factory guaranteed for one year. 01A $7.95, 6A7 $3.80, 6A8M $2.95, 6D6/78 $2.95, 6F6 $4.20, 6KTGT $2.95, 24A $4.50, 26 $4.95, 27 $4.50, 35/51 $4.50, 45 $5.95, 58 $3.30, 80 $2.98, 84 $2.00. Sale expires 5/1/78. Add $2.00 per order postage and handling. FREE catalog of over 1,000 tube types. Connolly, P.O. Box 1333H, Sun Valley CA 91352.

FOR SALE OR TRADE: Tubes - Have several hundred tubes for sale. Old and new types for radio and TV. Used and new - Cheap. SASE for list. Bruce Harbeck, 1316 - 38th St., Sioux City, Iowa 51104.

WD11 and UV99 adaptors. Use any UX base tube $5.00 ea.pp., U.S.A., 2 for $10.00 either type.
AK brass thumb nuts as used on Breadboards and Mod. 20 sets, 10 for $8.00pp. K. Parry, 17557 Horace St., Granada Hills CA 91344.

FOR SALE: Rider's Radio Volumes VI through XIV, 9 large manuals, fine condition, only $125. Lawrence Beitman, Box 46, Highland Park, IL 60035.

SALE/TRADE: A-K 20, Freshman Kellogg others. Five page list. Dime & SASE. Chet Wisner, 1014 Main St., Dalton MA 01226.

HAVE ANTIQUE RADIO & TV TUBES. Also some antique & old radios. Send 26¢ stamps for list w/prices. Harold's Radio, 3106 N. 3rd St., Harrisburg PA 17110.

FOR SALE OR TRADE

FOR SALE: STEWART-WARNER Model 801, series B in good condition and working, but withour original speaker or cabinet lid. Best offer or trade. Michael Nowicki, P.O. Box 2436, San Jose CA 95109

WANTED

WANTED: Control knob for Philco 2" Safari TV, Sony 1" TV, one, two, and three tube Philmore Battery radios. DeForest Radio Home, Westinghouse Aeriola Jr., Sr., Tuska expert tuner type 220, standard type 222. Darcy Brownrigg, Chelsea, Quebec, JOX 1NO Canada.

WANTED: Large lot external horn phonographs, parts, cylinder records, crystal sets, battery radios factory mfg., before 1926. Will pay $75. for mint Lambert Jr. Crystal set. Young, 11 Willow Court, Totowa, New Jersey 07512.

WANTED: Outside horn phonographs will pay $100 to $1000 each. Don't advertise yours I will probably pay more. Charles Seidel, 925 Starlite, Grants Pass OR 97526. Telephone: 503 476-1078.

WANTED: DeForest tuning dials, as used on Interpanel set shown on page 83 of "Vintage Radio," or will buy the complete tuning unit, or any old DeForest parts. Ralph Maddox, Purgitscille W.VA 26852.

WANTED: National SW-3 complete with power supply and coils. Must be mint. WB1BVO, Norman A. Parsons, 22 Forest St., Branford CT 06405.

WANTED: Schematic for Navy Receiver CRV 46156 RAL-7, RCA. AR, 3 stage RF Amp. DA, Dector, Amp. Wayne Wright, Pocahontas VA 24635.

WANTED: Power supply and knobs for Radiola 67. D. S. Voydanoff, 1141 Yorkshire, Grossepointe Park, Michigan 48230.

WANTED: WIRE RECORDERS; Brush, Armour, Telegraphone or oddball types. H. Leyer, AV-SFSU, 1600 Holloway, San Francisco CA 94132.

WANTED: Any one out there who has an extra Loose-Coupler for sale similar to those shown on page 153 in VINTAGE RADIO. Ralph G. Maddox, Purgitsville, W VA 26852.

WANTED: Automotive Radio items, any quantity. Cash paid. Marvin Roth, 14500 LaBelle, Oak Park MI 48237.

WANTED: Kennedy, DeForest and Marconi sets. Trade or buy. Steve Lange, Waldo WI 53093. (414) 541-4811.

WANTED: Zenith Stratosphre in very good condition. Mark Mathison, 103 S. Park, Medford, Wisc. 54451.

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PUETT ELECTRONICS

P.O. BOX 28572 DALLAS TEXAS 75228
PUBLISHERS OF
THE CLASSIC RADIO NEWSLETTER

LIST NO. 16A

(send 13¢ stamp for newsletter sample)

SCHEMATIC DIAGRAMS
WE CAN FURNISH SCHEMATICS ON ANY RADIO (1920 to 1954) - $1.50 postpaid. IF YOU CAN NOT FURNISH THE NAME OF THE MANUFACTURER AND THE MODEL NUMBER, SEND THE TYPES AND QUANTITY OF TUBES AND WE WILL RESEARCH OUR FILES FOR A SIMILAR SET WHICH USES THE SAME TUBES - RESEARCH $3.00 postpaid.

NEW ACQUISITIONS LIST
01A, 99, WD-11, etc. when in stock, ANTIQUE RADIO SETS AND TEST GEAR, ANTIQUE RADIO BOOKS, AND OTHER "one at a time" items-- list sent by first class mail four to six times a year by subscription -- $2.00 per year.

BALLAST TUBES send for catalog.

THE PUETT ELECTRONICS SUPER ANTENNA - GROUND SYSTEM plans $2.

PUETT ELECTRONICS **LISTS - BOOKS & BOOKLETS** (postpaid)
(1) THE ACQUISITION OF ANTIQUE RADIOS by J. W. F. Puett $2.00
(2) THE COMPLETE RESTORATION OF BATTERY POWERED ANTIQUE RADIOS by J. W. F. Puett $2.00
(3) THE COMPLETE RESTORATION OF AC POWERED ANTIQUE RADIOS by J. W. F. Puett $2.00
(4) COMPLETE LIST OF ANTIQUE RADIO SERVICES $2.00 (new list)
(5) WHEN WAS THAT OLD TUBE MADE? by James R. Wilkins $2.00
(6) SILVER GHOSTS by J. W. F. Puett - classic sets by E. H. Scott $10.00
(7) MILITARY TUBE TYPE (VT) TO COMMERCIAL TUBE TYPE CROSS-REFERENCE LIST $1.00

HOW TO ORDER

(1) Make checks and money orders payable to PUETT ELECTRONICS.
(2) WE SHIP PARCEL POST, NO C.O.D. INCLUDE 15% FOR POSTAGE & HANDLING. POSTAL INSURANCE RATES ARE 60¢ FOR ORDERS UP TO FIFTY DOLLARS. MINIMUM ORDER $3.00 - DOES NOT APPLY TO SCHEMATIC DIAGRAMS OR BOOKLETS. ORDERS WHICH EXCEED $50.00 ARE SHIPPED POSTPAID. TEXAS RESIDENTS ADD 5% STATE SALES TAX.

POLICY

CUSTOMER SATISFACTION GUARANTEED. If you are not satisfied with your order for any reason, tubes may be returned within ten days for refund or replacement with exception of tubes which are shorted or have open filaments. It will be assumed that returned tubes with open filaments or shorts were damaged in shipment. Shipping damage claims will be handled promptly through the post office on insured orders. PUETT ELECTRONICS assumes no liability for orders which are not insured, and no liability beyond that which is covered by postal insurance. The tubes listed herein are either new, military pull-outs, factory over-purchases, or used. If only new tubes in original cartons are acceptable, add 10% to the total cost of your tube order. REFUNDS are mailed with your invoice for out-of-stock merchandice. ALL TUBES ARE THOROUGHLY TESTED ON A MUTUAL CONDUCTANCE TUBE CHECKER BEFORE SHIPMENT. ALL TUBES MUST MEET NEW TUBE STANDARDS WHEN CHECKED. All prices are subject to change without notice. All tube prices listed herein supersede prices in previous lists and ads. We offer free technical advice for a 13¢ stamp or you may call J. W. F. Puett at 214-279-8309 NO LATER THAN 10:00 PM CENTRAL STANDARD TIME - PLEASE.

ANTIQUE RADIO TUBES

PUETT ELECTRONICS HAS HUNDREDS OF OTHER TUBE TYPES NOT LISTED HEREIN. FOR OTHER TUBE TYPES, SEND 65¢ FOR CATALOG.

0D3	$2	1G4	$4	1T5	$3	5Y4	$3	6A3	$5	6C5	$3	6R7	$4	7B5	$3
0Z4	$3	1G5	$4	1U4	$3	5Z3	$3	6A4	$6	6C6	$4	6S4	$4	7B6	$4
1A1	$5	1G6	$4	1U5	$3	5Z4	$3	6A5	$4	6C7	$4	6S8	$4	7B7	$4
1A3	$4	1H4	$5	1V	$5	6A3	$5	6A6	$4	6C8	$4	6SA7	$3	7B8	$4
1A4	$4	1H6	$4	2A3	$7	6A4	$6	6A7	$5	6D6	$4	6SB7	$3	7C5	$3
1A5	$4	1J6	$4	2A4	$5	6A8	$4	6AB4	$3	6D7	$4	6SC7	$3	7C6	$4
1A6	$3	1L6	$8	2A5	$4	6AB7	$3	6AC7	$3	6D8	$4	6SD7	$3	7C7	$4
1A7	$3	1LA4	$4	2A6	$4	6AC5	$3	6AK5	$2	6E5	$5	6SF5	$3	7E6	$4
1B4	$4	1LA6	$4	2A7	$5	6AC7	$3	6AL5	$3	6E6	$4	6SF7	$3	7E7	$4
1B5	$4	1LB4	$4	2B7	$4	6AK5	$2	6AL7	$5	6E7	$4	6SG7	$4	7F8	$5
1B7	$4	1LC5	$5	2E5	$5	6AL5	$3	6AQ5	$2	6F5	$4	6SH7	$3	7G7	$4
1B8	$4	1LC6	$4	2X2	$3	6AL7	$5	6AT6	$2	6F6	$4	6SJ7	$3	7H7	$4
1C1	$4	1LD5	$4	3A5	$3	6AQ5	$2	6AU6	$2	6F7	$6	6SK7	$3	7J7	$4
1C5	$3	1LE3	$4	3A8	$4	6AT6	$2	6AV6	$2	6F8	$4	6SL7	$3	7L7	$4
1C6	$3	1LF3	$4	3C6	$4	6AU6	$2	6AX5	$2	6G5	$5	6SN7	$2	7Q7	$4
1C7	$5	1LG5	$4	3LF4	$5	6AV6	$2	6B4	$5	6G6	$3	6SQ7	$3	7R7	$4
1D5	$5	1LH4	$4	3Q5	$3	6AX5	$2	6B5	$5	6H6	$2	6SR7	$3	7S7	$4
1D7	$5	1LN5	$4	3V4	$3	6B4	$5	6B6	$5	6J5	$3	6SS7	$3	7V7	$4
1E5	$5	1N5	$4	5AZ4	$5	6B5	$5	6B7	$5	6J6	$2	6ST7	$3	7W7	$4
1E7	$4	1N6	$4	5R4	$2	6B6	$5	6B8	$4	6K6	$3	6SU7	$3	7X6	$4
1F4	$4	1P5	$4	5T4	$2	6B7	$5	6BA6	$2	6K7	$4	6SV7	$3	7X7	$4
1F5	$4	1Q5	$4	5U4	$2	6B8	$4	6BE6	$3	6K8	$4	6T7	$4	7Y4	$4
1F6	$4	1R5	$2	5V4	$2	6BA6	$2	6BJ6	$2	6L5	$4	6U5	$5	7Z4	$3
1F7	$5	1S5	$2	5W4	$2	6BE6	$3	6C4	$2	6L6	$3	6U7	$5	10	$7
		1T4	$3	5X4	$3	6BJ6	$2	6C6	$2	6L7	$4	6V6	$2	12A5	$4
				5Y3	$3	6C4	$2	6Q7	$4	7A4	$4	6V7	$4	12A6	$4
										7A5	$3	6X4	$2	12A7	$4
										7A6	$4	6X5	$2	12A8	$4
										7A7	$4	6Y5	$3	12AH7	$3
										7A8	$4	6Z4	$3	12AT6	$2
										7AE7	$4	6Z5	$3	12AT7	$2
										7AG7	$4	6Z7	$2	12AU6	$2
										7B4	$4	6ZY5	$3	12AU7	$2

12AV6	$2	12K7	$4	25AC5	$3	50C6	$4	117N7	$7						
12AX7	$2	12K8	$4	25B6	$3	50L6	$3	117P7	$7						
12B7	$4	12L6	$2	25C6	$2	50X6	$4	117Z3	$3						
12B8	$4	12Q7	$4	25L6	$3	50Y7	$4	117Z4	$4						
12BA6	$2	12S8	$3	25S	$4	51	$4	117Z6	$4						
12BE6	$2	12SA7	$3	25Z5	$3	55	$5	485	$5						
12C5	$3	12SC7	$3	25Z6	$3	56	$3	884	$7						
12C8	$4	12SF5	$3	26	$6	57	$4	950	$5						
12F5	$3	12SF7	$3	26A6	$4	58	$4	951	$5						
12H6	$3	12SG7	$3	26A7	$4	59	$6	955	$4						
12J5	$3	12SH7	$3	27	$4	70A7	$3	958	$4						
12J7	$4	12SJ7	$3	28D7	$3	70L7	$5	1201	$4						
		12SK7	$3	30	$5	71A	$7	1203	$4						
		12SL7	$3	31	$4	75	$4	1232	$4						
		12SN7	$3	32	$4	76	$3	1273	$4						
		12SQ7	$3	33	$4	77	$4	1852	$3						
		12SR7	$3	34	$4	78	$4	1853	$3						
		12V6	$3	35	$4	79	$4	9002	$3						
		12X4	$2	35A5	$4	80	$3	9003	$3						
		12Z3	$2	35B5	$2	81	$6	9004	$4						
		14A4	$4	35C5	$2	82	$3	VR-90	$2						
		14A5	$4	35L6	$3	83	$3	VR-105	$2						
		14A7	$4	35W4	$2	83V	$3	VR-150	$2						
		14B5	$3	35Y4	$4	84	$3	VT-52	$5						
		14B6	$4	35Z3	$4	85	$4	FM1000	$4						
		14B8	$4	35Z4	$4	89	$4	XXB	$4						
		14C5	$3	35Z5	$3	117L7	$5	XXL	$4						
		14C7	$4	35Z6	$4	117M7	$5	XXFM	$4						
		14E6	$4	36	$4										
		14E7	$4	37	$4										
		14F7	$4	38	$3										
		14F8	$4	39	$3										
		14H7	$4	40	$7										
		14J7	$4	41	$4										
		14N7	$4	42	$4										
		14Q7	$4	43	$4										
		14R7	$4	44	$3										
		14W7	$4	45	$6										
		14X7	$4	47	$7										
		15	$7	48	$4										
		19	$4	49	$4										
		22	$7	50	$7										
		24A	$5	50A5	$3										
		25A6	$3	50B5	$2										
		25A7	$3	50C5	$2										

FOR
Tops in Performance

REPLACE WEAK OR DEAD TUBES IN YOUR RADIO

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PUETT ELECTRONICS
P.O. BOX 28572 DALLAS TEXAS 75228
PUBLISHERS OF
THE CLASSIC RADIO NEWSLETTER

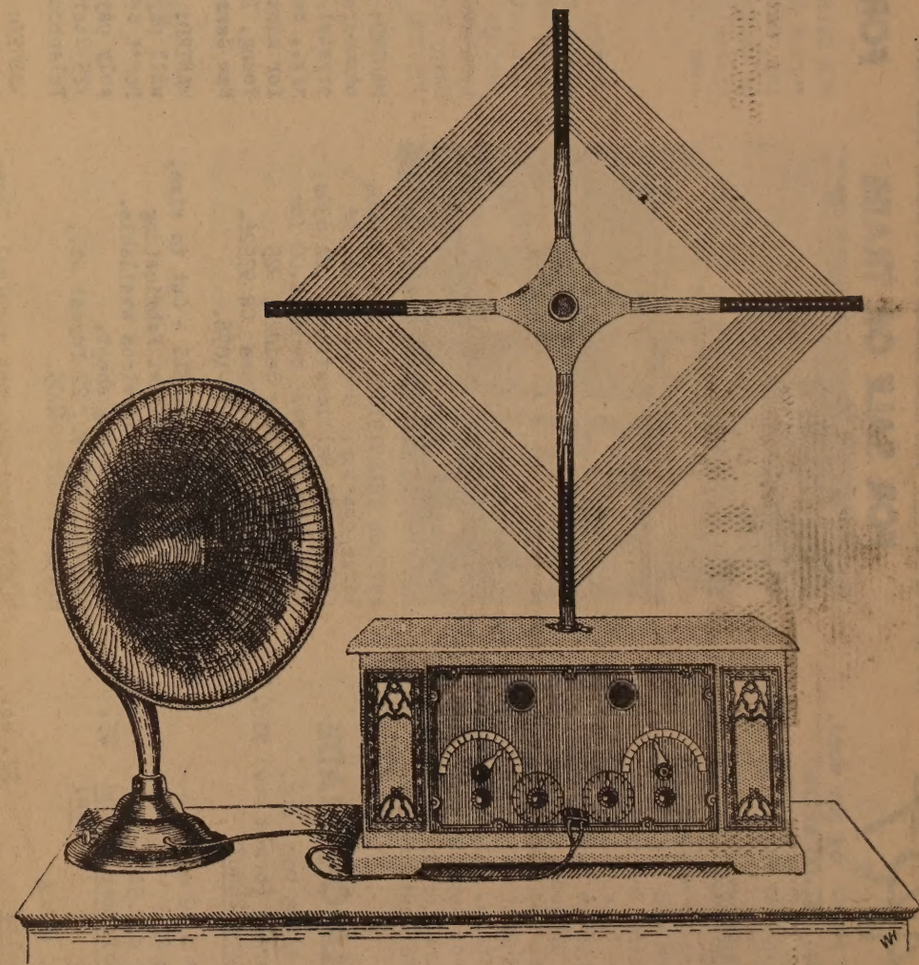
PUETT ELECTRONICS PUETT ELECTRONICS PUETT ELECTRONICS PUETT ELECTRONICS PUETT ELECTRONICS

MARCH

75c

THE HORN SPEAKER

1978



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De Forest

1925.

The D-17-A is pictured above. The D-17 has the same circuit but the speaker is self-contained.